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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/723,716

11/26/2003

Prathyusha K. Salla

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EXAMINER

WEATHERBY, ELLSWORTH

ART UNIT

PAPER NUMBER

3768

7590 10/23/2006

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DATE MAILED: 10/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/723,716

Applicant(s)

SALLA ET AL.

Examiner

Ellsworth Weatherby

Art Unit

3768

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/26/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 6, and 15-18, are rejected under 35 U.S.C. 102(b) as being anticipated by Pflaum (U.S. Patent No. 6,324,254).

Pflaum '254 discloses a digital control unit for imaging an organ comprising a routine for acquiring a set of motion data for two or more organs from at least one of one or more types of electrical sensors and one or more types of non-electrical sensors; a routine for processing the set of motion data to extract two or more prospective gating points for an organ of interest; and a routine for acquiring a set of image data representative of the organ of interest using the two or more prospective gating points (col. 1, lines 45-54; col. 2, lines 33-65). Pflaum '254 also discloses reconstructing a set of image data to generate a set of reconstructed data; and generating an image from the set of reconstructed data (col. 1, lines 45-54; col. 4, lines 23-28). Pflaum '254 further discloses a routine for fusing a set of image data representative of structure with at least one of a set of image data representative of motion and a set of image data representative of electrical activity (col. 3, lines 55-67; col. 4, lines 1-27). Pflaum '254 also discloses a routine for acquiring the set of motion data that activates at least one of

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the electrical sensors and the non-electrical sensors in accordance with a set of positional data acquired by one or more positional sensors (col. 3, lines 55-67; col. 4, lines 1-35).

3. Claims 25, 37,38 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Liu (U.S. Patent No. 6,233,478).

Liu '478 teaches an imager configured to generate a plurality of signals representative of a region of interest; data acquisition circuitry configured to acquire the plurality of signals; data processing circuitry configured to receive process the plurality of signals; system control circuitry configured to operate at least one of the imager and the data acquisition circuitry; an operator workstation configured to communicate with the system control circuitry and to receive the processed plurality of signals from the data processing circuitry; and a sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of two or more organs within the region of interest (col. 2, lines 2-11; col. 7, lines 45-65; col. 11, lines 17-39). Liu further teaches a system control for acquiring a set of image data representative of an organ of interest using the two or more prospective gating points (col. 4, lines 66-67; col.5, lines 1-10).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5, 8-14, and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pflaum '254 in view of Li et al. (U.S. Patent No. 6,836,529).

Regarding claim 5, the invention of Pflaum '254 teaches all the limitations of the claimed invention, as described in the above claim 1 rejection, except for explicitly disclosing that the set of motion data for one or more organs is acquired by at least two of one or more types of electrical sensors.

In the same field of endeavor, Li et al. '529 teaches acquiring motion data from two of one or more types of electrical sensors (col. 5, lines 44-47).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the imaging system of Pflaum '254 to include multiple electrical sensors to acquire motion data from several sources as taught by Li et al. '529 for the purposes of decreasing motion artifacts from different organs or different parts of the same organ in the final image.

Regarding claims 8-14 and 20-23, Pflaum '254 teaches an imaging system using a system control for imaging an organ comprising a routine for acquiring a set of motion

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data for two or more organs from at least one of one or more types of electrical sensors and one or more types of non-electrical sensors; a routine for processing the set of motion data to extract two or more prospective gating points for an organ of interest; and a routine for acquiring a set of image data representative of the organ of interest using the two or more prospective gating points (col. 1, lines 45-54; col. 2, lines 33-65). Pflaum '254 also discloses reconstructing a set of image data to generate a set of reconstructed data; and generating an image from the set of reconstructed data (col. 1, lines 45-54; col. 4, lines 23-28). Pflaum '254 further discloses a routine for fusing a set of image data representative of structure with at least one of a set of image data representative of motion and a set of image data representative of electrical activity (col. 3, lines 55-67; col. 4, lines 1-27). Pflaum '254 also discloses a routine for acquiring the set of motion data that activates at least one of the electrical sensors and the non-electrical sensors in accordance with a set of positional data acquired by one or more positional sensors (col. 3, lines 55-67; col. 4, lines 1-35).

Pflaum '254 does not explicitly teach acquiring a set of motion for two or more organs from at least two of one or more types of electrical sensors and one or more types of non-electrical sensors.

In the same field of endeavor, Li et al. '529 teaches acquiring data indicative of motion from two or more organs from two of one or more types of electrical sensors (col. 5, lines 44-47).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the imaging system of Pflaum '254 to include multiple electrical

sensors to acquire motion data from several sources as taught by Li et al. '529 for the purposes of decreasing motion artifacts in the final image.

6. Claims 7 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pflaum '254 in view of Schweikard et al. (U.S. Patent No. 6,144,875).

Pflaum '254 teaches all the limitations of the claimed invention, as described in the above rejection, except for explicitly disclosing that a set of motion data is at least partially acquired from a set of pre-acquisition image data

In the same field of endeavor, Schweikard et al '875 discloses a set of motion data that is at least partially acquired from a set of pre-acquisition image data (col. 3, lines 39-47).

It would have been obvious to combine the imaging system of Pflaum '254 with the multiple organ sensors of Schweikard et al. '875. The motivation to combine the two would be to produce the highest quality image with the reduction of motion artifacts utilizing a base image to determine efficacy.

7. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pflaum '254 in view of Li et al. (U.S. Patent No. 6,836,529) as applied to claim 20 above, and further in view of Schweikard et al. '875.

The modified invention of Pflaum '254 teaches all the limitations of the claimed invention except for explicitly disclosing that a set of motion data is at least partially acquired from a set of pre-acquisition image data

In the same field of endeavor, Schweikard et al. '875 discloses a set of motion data that is at least partially acquired from a set of pre-acquisition image data (col. 3, lines 39-47).

It would have been obvious to combine the modified imaging system of Pflaum '254 with the multiple organ sensors of Schweikard et al. '875. The motivation to combine the two would be to produce the highest quality image with the reduction of motion artifacts utilizing a base image to determine efficacy.

8. Claims 26-28 and 39, are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu '478 in view of Ustuner et al. (U.S. PGPub. 2004/0006266).

Regarding claims 26-28, the disclosure of Liu '478 teaches all the limitations of the claimed invention except the imaging system further comprising one or more positional sensors configured to activate one or two or more electrical sensors for the sensor-based motion measurement system based on the position of the two or more electrical sensors relative to the imager. Liu '478 also does not explicitly disclose measuring non-electrical activity indicative of motion in than one organ.

Ustuner et al. '266 teaches activating one or two or more electrical sensors to measure more than one physiological parameter indicative of motion in more than one organ (0038-0039).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the imaging program of Liu '478 with the multiple electrical sensors for sensing motion in more than one organ as taught by Ustuner '266. The

motivation to combine the two would be for the purposes of aiding in the alignment of positional data with other electrical or non-electrical data.

Regarding claim 39, Liu '478 teaches an imager configured to generate a plurality of signals representative of a region of interest; data acquisition circuitry configured to acquire the plurality of signals; data processing circuitry configured to receive process the plurality of signals; system control circuitry configured to operate at least one of the imager and the data acquisition circuitry; an operator workstation configured to communicate with the system control circuitry and to receive the processed plurality of signals from the data processing circuitry; and a sensor-based motion measurement system configured to measure electrical and/or non-electrical activity indicative of the motion of two or more organs within the region of interest (col. 2, lines 2-11; col. 7, lines 45-65; col. 11, lines 17-39). Liu further a system control for acquiring a set of image data representative of an organ of interest using the two or more prospective gating points (col. 1, line 21-35).

Liu '478 does not explicitly disclose data acquisition circuitry based upon two or more prospective gating points derived from a set of motion data describing of the motion of two or more organs measuring non-electrical activity indicative of motion in than one organ

Ustener et al. '266 teaches activating one or two or more electrical sensors to measure more than one physiological parameter indicative of motion in more than one organ to use as prospective gating data for the imager (0038-0039).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the imaging program of Liu '478 with the multiple electrical sensors for sensing motion in more than one organ as taught by Ustener '266. The motivation to combine the two would be for the purposes of aiding in the alignment of positional data with other electrical or non-electrical data.

9. Claims 29-31 and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu '478 in view of Schlossbauer et al. (U.S. PGPub. 2002/0091314).

Regarding claims 29 and 30, the disclosure of Liu '478 teaches all the limitations of the claimed invention except for explicitly stating that the sensor based motion measurement system is configured to measure non-electrical indicative of the motion of two or more organs via one or more non-electrical sensor.

In the same field of endeavor, Schlossbauer et al. '314 discloses the use of one or more non-electrical sensors comprising accelerometers, optical markers, displacement sensors, force sensors ultrasonic sensors, strain gauges photodiodes, and pressure sensors to measure data indicative of motion in two or more organs (0019-0025).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the imaging apparatus of Liu '478 to include non-electrical displacement sensors as taught by Schlossbauer et al. '314 for the purpose of reducing motion induced imaging artifacts by collecting cardiac motion parameters within a moving volume.

Regarding claims 31 and 34-36, Liu '478 discloses an imager configured to generate a plurality of signals representative of a region of interest; data acquisition circuitry configured to acquire the plurality of signals; data processing circuitry configured to receive process the plurality of signals; system control circuitry configured to operate at least one of the imager and the data acquisition circuitry; an operator workstation configured to communicate with the system control circuitry and to receive the processed plurality of signals from the data processing circuitry; and a sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of two or more organs within the region of interest (col. 2, lines 2-11; col. 7, lines 45-65; col. 11, lines 17-39).

Liu '478 does not disclose two or more sensor-based motion measurement systems based on the position of the two or more electrical sensors relative to the imager.

Liu '478 also does not explicitly disclose at least one sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of two or more organs via two or more electrical sensors.

Liu '478 also does not explicitly disclose at least one sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of two or more organs via two or more non-electrical sensors where the non-electrical sensors comprise accelerometers, optical markers, displacement sensors, force sensors, ultrasonic sensors, strain gauges, photodiodes, and pressure sensors.

In the same field of endeavor, Schlossbauer et al. '314 discloses the use of two or more electrical or non-electrical sensors comprising accelerometers, optical markers, displacement sensors, force sensors ultrasonic sensors, strain gauges photodiodes, and pressure sensors to identify cyclic motion relative to other moving organs (0019-0025).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the imaging apparatus of Liu '478 to include non-electrical displacement sensors as taught by Schlossbauer et al. '314 for the purpose of reducing motion induced imaging artifacts by collecting cardiac motion parameters within a moving volume.

10. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu '478 in view of Schlossbauer et al. '314 as applied to claim 31 above, and further in view of Ustener et al. '266.

The modified invention of Liu '478 discloses all the limitations of the claimed invention except the imaging system further comprising one or more positional sensors configured to activate one or two or more electrical sensors for the sensor-based motion measurement system based on the position of the two or more electrical sensors relative to the imager.

Ustener et al. '266 teaches activating one or two or more electrical sensors to measure more than one physiological parameter indicative of motion (0038-0039).

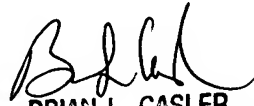
It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the imaging program of Liu '478 with the multiple electrical sensors of Ustener '266 for the purposes of aiding in the alignment of positional data with electrical or non-electrical sensor data.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ellsworth Weatherby whose telephone number is (571) 272-2248. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on (571) 272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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